

## AVIATION

The aviation program is designed to allow a student to qualify for Federal Aviation Administration (FAA) certificates and also complete requirements for a Bachelor of Science degree. Flight training is offered to qualify for the following certificates and ratings: Private Pilot Certificate, Commercial Pilot Certificate, Instrument Rating, Multiengine Rating, Flight Instructor Certificate, Instrument Instructor Rating, and Multiengine Instructor Rating.

Henderson State University is approved by the FAA to certify its qualified students for the Restricted ATP Certificate at 1,000 flight hours.

Students entering Henderson State University with a commercial pilot certificate with instrument and multiengine ratings issued by the FAA may receive the following credit as outlined below:

- Based upon having held a private pilot certificate (9 credit hours)
  - o AVN 1013 Fundamentals of Aeronautics I
  - o AVN 1021 Introduction to Aeronautics-Lab
  - o AVN 1403 Fundamentals of Aeronautics II
  - o AVN 1161 Private Pilot Certification
  - o AVN 1171 Private Pilot Lab
- Based upon having an instrument rating (9 credit hours)
  - o AVN 2393 Aviation Weather
  - o AVN 3383 Commercial Preparation and Procedures I
  - o AVN 3071 Instrument Pilot Certification
  - o AVN 3501 Commercial/Instrument Lab IIIo AVN 3511 Commercial/Instrument Lab IV
- Based upon holding a commercial pilot certificate (10 credit hours)
  - o AVN 2031 Commercial Pilot Certification
  - o AVN 3433 Commercial Preparation and Procedures II
  - o AVN 2051 Commercial/Instrument Pilot Lab I
  - o AVN 2491 Commercial/Instrument Lab II
  - o AVN 4521 Commercial/Instrument Lab V
  - o AVN 2413 Regulations and Publications
- Based upon having a multiengine rating (2 credit hours)
  - o AVN 4131 Multiengine Operations
  - o AVN 4421 Multiengine Pilot Lab
- Notes
  - o The awarding of credit outlined above precludes participation in Henderson's R-ATP program
  - o Credit as outlined above will not be given until participating students successfully completes 15 credit hours at Henderson

All flight training is conducted by certified flight instructors under the guidelines of Federal Aviation Regulations, Parts 141 and 61. The Airway Science Curriculum has received program recognition from the Federal Aviation Administration and the University Aviation Association.

Flight programs require a commitment from students. Students should plan on flying at least three times per week to meet their flight lab. Before beginning flight training, each student must pass at least a third class medical examination administered by an FAA medical examiner, obtain a student pilot's certificate (or greater), and receive Transportation Security Administration (TSA) certification. Students must also successfully complete a program entrance interview. Flight fees for aviation courses are in addition to the regular college registration fees. Flight fees consists of aircraft rental, one-on-one flight instruction charges for instruction given during flight, and one-on-one ground flight instruction given on the ground by FAA certified flight instructors. These fees are charged to the student after each flight and/or ground lesson contingent upon the amount of time spent in the aircraft and/or with the flight instructor. Students must meet eligibility requirements in CFR Title 14, Parts 61 and 141 applicable to the FAA certificate/rating being sought.

Three basic criteria are necessary to progress from one flight lab to the next: (1) the mandatory flight hours for the enrolled flight lab must be completed during the semester enrolled, (2) all flight and ground lessons in the flight lab must be completed to the published completion standards during the semester enrolled, and (3) the specified minimum overall GPA of 2.5 must be maintained. Lab grades will be assessed based upon the percentage of lab lessons completed and the percentage of mandatory hours completed. Students that do not complete all lab lessons within the mandatory hours must still complete those lessons prior to progressing to the next flight lab. Flight and ground fees will be charged to the student on a per-hour basis to complete any lab lessons that were not completed during the mandatory flight hours. If a student is unable to complete the flight lab within the registered semester as shown in the published class schedule, or within the mandatory flight hours, the student must bring this problem to the attention of the chief flight instructor, or their designee, as this may affect future funding for subsequent flight lessons and flight labs. It is the responsibility of the student to pay for any flight and ground fees not paid by financial aid and/or other providers of financial assistance. It is not mandatory that all flight fees be paid at the beginning of the semester – additional information on flight fee payment requirements may be obtained from the Aviation program.

Students are responsible for attending each scheduled flight lesson. Any missed lessons will be handled in accordance with the no-show policies stated in the Flight Operations Manual (FOM). A failed flight lab will not be allowed to be repeated due to poor attendance. Students may repeat a failed flight lab once, however if a student fails more than one flight lab they will not be permitted to continue in the flight training program.

In the event the student is unable to complete the flight lab by the end of the semester, due to circumstances beyond the student's control, a grade of "I" (incomplete) may be recorded for that flight lab at the faculty's discretion. If a grade of "I" is awarded, then a contract for completion will be filled out and those contract requirements must be complied with before a letter grade

will be issued. Final grades for flight labs will be based on the individual lab grading policies stated in the syllabus.

**Major Requirements for the Bachelor of Science Degree - Professional Pilot Track**  
(Minor required)

	Hours
AVN 1013 Fundamentals of Aeronautics I .....	3
AVN 1021 Introduction to Aeronautics-Lab .....	1
AVN 1403 Fundamentals of Aeronautics II .....	3
AVN 1161 Private Pilot Certification .....	1
AVN 1171 Private Pilot Lab .....	1
MTH 1243 College Algebra .....	3
MTH 1253 Plane Trigonometry, or .....	3
MTH 1233 Applied Trigonometry	
PHY 2034 General Physics I .....	4
PHY 2044 General Physics II .....	4
AVN 2393 Aviation Weather .....	3
AVN 2413 Regulations and Publications .....	3
AVN 2051 Commercial/Instrument Pilot Lab I .....	1
AVN 3383 Commercial Preparation and Procedures I .....	3
AVN 3071 Instrument Pilot Certification .....	1
AVN 3433 Commercial Preparation and Procedures II .....	3
AVN 2491 Commercial/Instrument Lab II .....	1
AVN 3501 Commercial/Instrument Lab III .....	1
AVN 3511 Commercial/Instrument Lab IV .....	1
AVN 4521 Commercial/Instrument Lab V .....	1
AVN 2031 Commercial Pilot Certification .....	1
AVN 4131 Multiengine Operations .....	1
AVN 4421 Multiengine Pilot Lab .....	1
AVN 2213 Aviation Safety .....	3
AVN 3233 Aircraft Systems Theory .....	3
AVN 3243 Aircraft Powerplant Theory .....	3
AVN 3263 Air Traffic Control .....	3
AVN 4253 Aviation Legislation (WI) .....	3
AVN 4223 Advanced Aerodynamics and Performance .....	3
AVN 4483 Advanced Technology and Automation .....	<u>3</u>
Total Major Requirements .....	65

**To qualify for the Restricted ATP qualification, students must complete all courses in the Professional Pilot track and these additional courses:**

AVN 4101 Flight Instructor Lab .....	1
AVN 4121 Instrument Instructor Lab .....	1
AVN 4333 Flight Instructor Practicum .....	3
AVN 4341 Flight Instructor Certification .....	1
AVN 4373 Instrument Flight Instructor Practicum .....	3

**For the Bachelor of Science Degree – Aviation Management Track**  
(Minor required)

	<u>Hours</u>
AVN 1013 Fundamentals of Aeronautics I .....	3
ANV 1403 Fundamentals of Aeronautics II .....	3
AVN 2213 Aviation Safety .....	3
<b>AVN 4253</b> Aviation Legislation (WI) .....	3
AVN 3263 Air Traffic Control .....	3
AVN 4283 Airport Management .....	3
AVN 4293 Air Transportation .....	3
MGM 3113 Management and Organizational Behavior .....	3
MGM 4023 Human Resource Management .....	3
MGM 4073 Operations Management .....	3
MGM 4153 Organizational Leadership .....	3
COM 3273 Organizational Communication .....	3
MTH 1243 College Algebra .....	3
MTH 1xxx Math course 1003 or higher.....	3
GBU 2013 Quantitative Analysis for Business Decisions .....	3
GBU 3143 Legal Environment of Business .....	3
CSC 2003 Introduction to Computers .....	3
CSC 2163 Computer Applications .....	3
ENG 3613 Technical Writing .....	3
GBU 3133 Descriptive Analytics .....	<u>3</u>
Total Major Requirements .....	60

**For the Bachelor of Science Degree - Aviation Maintenance Management Track**

**MINOR NOT REQUIRED**

Hours

Courses completed in Aviation Mechanics Technical School during the Freshman and Sophomore years .....	62
AVN 1013 Fundamentals of Aeronautics I .....	3
AVN 1021 Introduction to Aeronautics Lab .....	1
AVN 1403 Fundamentals of Aeronautics II .....	3

AVN 1061 Private Pilot Certification .....	1
AVN 1171 Private Pilot Certification Lab .....	1
CHM 1034 General Chemistry Non-Majors .....	4
BIS 2073 Fundamentals of Information Systems .....	3
AVN 4223 Advanced Aerodynamics .....	3
AVN 3283 Aviation Management .....	3
MGM 3113 Management and Organizational Behavior .....	3
AVN 2213 Aviation Safety .....	3
AVN 4253 Aviation Legislation (WI) .....	3
ENG 3613 Technical Writing .....	3
Total Major Requirements .....	96

Aviation Maintenance Management track students must also complete 24 upper level credit hours of electives, with at least 9 of those 24 upper level credit hours being upper level aviation courses.

All non-aviation courses required by the aviation major must be passed with a grade of "C" or higher.

Students participating in the Aviation Maintenance Management track may have the requirements of AVN 1021 Introduction to Aeronautics Lab, AVN 1061 Private Pilot Certification, and AVN 1171 Private Pilot Lab waived upon approval of the director of the program.

### **Requirements for Minor in Aviation**

(for Minor in Aviation without an emphasis on Small Unmanned Aircraft Systems)

- AVN 1013 Fundamentals of Aeronautics I
- AVN 1403 Fundamentals of Aeronautics II
- AVN 2213 Aviation Safety
- AVN 3233 Aircraft Systems Theory
- AVN 3243 Aircraft Powerplant Theory
- AVN 4253 Aviation Legislation (WI)

### **Requirements for Minor in Aviation with Emphasis on Small Unmanned Aircraft Systems**

The minor in Aviation with Emphasis on Small Unmanned Aircraft Systems provides the education and training to obtain the Federal Aviation Administration's Remote Pilot – Small Unmanned Aircraft Systems certificate. This minor also includes engineering courses needed to

understand techniques and processes used in the construction of Small Unmanned Aircraft Systems.

- EGR 1201 Introduction to Engineering EGR 1413 Engineering Graphics
- One of the following three courses: ○ EGR1011 Engineering Shop, or ○ EGR 2584 Electrical Circuits I, or ○ EGR 3474 Electronics I
- AVN 3143 Fundamentals of Small Unmanned Aerial Systems
- AVN 3151 sUAS Lab
- AVN 3253 Aviation Legislation

### **Requirements for Commercial Pilot Certificate Program**

Students completing the Commercial Pilot Certificate Program will obtain the skills required to safely operate a single engine aircraft as a commercial pilot in visual meteorological conditions and instrument meteorological conditions within the U.S. National Airspace System. Students will also learn and apply federal regulations as they apply to legally operating an aircraft in the U.S. National Airspace System. Prerequisites: Possess a valid private pilot certificate and second class medical certificate issued by the U.S. Federal Aviation Administration.

- AVN2413 Regulations and Publications
- AVN3383 Commercial Preparation and Procedures I
- AVN3433 Commercial Preparation and Procedures II
- AVN2051 Commercial / Instrument Lab I
- AVN2491 Commercial / Instrument Lab II
- AVN3501 Commercial / Instrument Lab III
- AVN3511 Commercial / Instrument Lab IV
- AVN4521 Commercial / Instrument Lab V

### **Requirements for Certified Flight Instructor Certificate Program**

Students completing the Certified Flight Instructor Certificate Program will obtain the skills and knowledge required to safely provide flight instruction to student pilots in accordance with Federal Aviation Administration regulations. Prerequisites: Possess a valid commercial pilot certificate with an instrument rating and a second class medical certificate issued by the U.S. Federal Aviation Administration.

- AVN2413 Regulations and Publications
- AVN4101 Flight Instructor Lab
- AVN4333 Flight Instructor Practicum

## **Requirements for Small Unmanned Aerial Systems Certificate Program (Drone Program)**

Students completing the Small Unmanned Aerial Systems Certificate Program will obtain the skills required to safely operate a small drone in the National Airspace System; will understand federal regulations as they apply to legally operating a Small Unmanned Aerial Systems in the National Airspace System as required by the Federal Aviation Administration (FAA); will understand the role of the Federal Aviation Administration and other governmental bodies in the development, application and adjudication of aviation regulations; will understand aviation legal concepts as related to flight operations, contracts, insurance and liability based upon regulatory statutes and case law.

- AVN3143 Fundamentals of Small Unmanned Aerial Systems
- AVN3151 Small Unmanned Aerial Systems Lab
- AVN3253 Aviation Legislation

### **STANDARD OF PROGRESS (SOP) ADDENDUM TO FLIGHT**

Flight programs require a commitment from students. Students should plan on flying at least three times per week to meet their flight lab. Before beginning flight training, each student must pass at least a third class medical examination administered by an FAA medical examiner, obtain a student pilot's certificate (or greater), and receive Transportation Security Administration (TSA) certification. Students must also successfully complete a program entrance interview. Flight fees for aviation courses are in addition to the regular college registration fees. Flight fees consists of aircraft rental, one on-one flight instruction charges for instruction given during flight, and one on-one ground flight instruction given on the ground by FAA certified flight instructors. These fees are charged to the student after each flight and/or ground lesson contingent upon the amount of time spent in the aircraft and/or with the flight instructor. Students must meet eligibility requirements in CFR Title 14, Parts 61 and 141 applicable to the FAA certificate/rating being sought.

Two basic criteria are necessary to progress from one flight lab to the next: (1) the mandatory flight hours for the enrolled flight lab must be completed during the semester enrolled, and (2) all flight and ground lessons in the flight lab must be completed to the published completion standards during the semester enrolled. Lab grades will be assessed based upon the percentage of lab lessons completed and the percentage of mandatory hours completed. Students that do not complete all lab lessons within the mandatory hours must still complete those lessons prior to progressing to the next flight lab. Flight and ground fees will be charged to the student on a per-hour basis to complete any lab lessons that were not completed during the mandatory flight hours. If a student is unable to complete the flight lab within the registered semester as shown in the published class schedule, or within the mandatory flight hours, the student must bring this problem to the attention of the chief flight instructor, or their designee, as this may affect future

funding for subsequent flight lessons and flight labs. It is the responsibility of the student to pay for any flight and ground fees not paid by financial aid and/or other providers of financial assistance. It is not mandatory that all flight fees be paid at the beginning of the semester – additional information on flight fee payment requirements may be obtained from the Aviation Program.

Students are responsible for attending each scheduled flight lesson. Any missed lessons will be handled in accordance with the no-show policies stated in the Flight Operations Manual (FOM). A failed flight lab will not be allowed to be repeated due to poor attendance. Students may repeat a failed flight lab once, however if a student fails more than one flight lab they will not be permitted to continue in the flight training program.

In the event the student is unable to complete the flight lab by the end of the semester, due to circumstances beyond the student’s control, a grade of “I” (incomplete) may be recorded for that flight lab at the faculty’s discretion. If a grade of “I” is awarded, then a contract for completion will be filled out and those contract requirements must be complied with before a letter grade will be issued. Final grades for flight labs will be based on the individual lab grading policies stated in the syllabus.

<b>Mandatory Flight Hours and Fees</b>					
<b>Lab Name</b>	<b>Flight Hours<sup>1</sup></b>	<b>Flight Cost</b>	<b>Ground Hours</b>	<b>Ground Cost</b>	<b>Total</b>
ANV1021 Intro to Aeronautics Lab	11.3	\$1,876.90	7.0	\$316.75	\$2,193.65
AVN1171 Pvt. Pilot Certification Lab	27.0	\$4,269.18	14.0	\$633.50	\$4,902.68
AVN2051 Com/Instrument Lab I	17.7	\$2,792.40	6.0	\$271.50	\$3,063.90
AVN2491 Com/Instrument Lab II	45.6	\$5,302.83	4.5	\$203.63	\$5,506.45
AVN3501 Com/Instrument Lab III	26.3	\$3,542.35	13.0	\$588.25	\$4,130.60
AVN3511 Com/Instrument Lab IV	28.2	\$4,723.30	12.0	\$543.00	\$5,766.30
AVN4521 Com/Instrument Lab V	43.2	\$7,639.85	13.0	\$588.25	\$8,728.10
AVN4421 Multiengine Lab	25.3	\$4,902.98	10.0	\$452.50	\$5,955.48



AVN4101 CFI Lab	25.5	\$5,307.75	18.0	\$814.50	\$6,122.25
-----------------	------	------------	------	----------	------------

AVN4121 CFII Lab	17.6	\$3,166.00	12.0	\$543.00	\$3,709.00
------------------	------	------------	------	----------	------------

AVN4441 MEI Lab	5.5	\$2,102.88	3.5	\$158.38	\$2,261.25
-----------------	-----	------------	-----	----------	------------

Notes:

- 1) Mandatory fees are based upon hourly rates listed below. Flight cost includes both aircraft rental and flight instructor fees for dual flights. Also includes check ride fees incurred during Private Pilot Certification Lab, Com/Instrument Labs IV and V, ME Lab, CFI Lab, CFII Lab, and MEI Lab.
- 2) A fuel surcharge may be implemented if necessary to compensate for market fluctuations.
- 3) Fees are current at the time of catalog publishing but are subject to change during catalog printing cycles. Please contact the Department of Aviation or Registrar's office for the latest fee schedule.

**Aircraft and Instructor Fees (Per Hour or Per Check Ride)**

<b>Aircraft / Instructor</b>	<b>Description</b>	<b>Cost / Hour</b>
Maule	Four-place trainer	\$123.25
PA-28R-201	Four-place complex glass-cockpit trainer	\$145.25
PA-30	Multi-engine trainer	\$228.00
Citabria	Tail-wheel & spin trainer	\$97.25
Cessna C-172RG	Four-place complex trainer	\$127.25
Redbird FMX AATD	Flight simulator with motion	\$90.50
Instructor	FAA Certified Flight Instructor	\$45.25
DPE-SE	FAA DPE – Single engine check ride	\$500.00
DPE-ME	FAA DPE – Multiengine check ride	\$600.00
DPE-Flight Instructor SE	FAA DPE – Flight Instructor SE check ride	\$600.00
DPE-Flight Instructor ME	FAA DPE – Flight Instructor ME check ride	\$700.00
DPE-Retest	FAA DPE – Retest of failed check ride	\$400.00

## NATURAL SCIENCES (updated August 2023)

The Bachelor of Science in Natural Sciences provides degree pathways for students interested in exploring the world through the natural sciences (biology, chemistry, and physics). A strong emphasis is placed on experiential learning and laboratory-based applications. This degree serves students pursuing prerequisites for medical school, dental school, pharmacy school, dental hygiene school, veterinary school, optometry school, and physics therapy school, as well as students who are interested in a broad science education.

### **Major Requirements for the Bachelor of Science in Natural Sciences**

Required Natural Sciences Core courses - 34 hours:

PHY 2034 General Physics I **OR** PHY 2234 University Physics I  
PHY 2044 General Physics II **OR** PHY 2244 University Physics II  
MTH 1243 College Algebra  
STA 2053 Applied Biostatistics **OR** STA 2323 Statistical Methods  
BIO 2104 Botany  
BIO 2114 Zoology  
BIO 2094 Microbiology  
CHM 1034 General Chemistry **OR** CHM 1014 University Chemistry I  
CHM 1044 General Organic & Biochemistry **OR** CHM 1024 University Chemistry II

Additional Requirements within the Major - a minimum of 16 hours of 3000/4000 courses in Biology, Chemistry, and Physics

The general track allows these 16 hours to be taken from among the following courses. Note that courses may have prerequisites. (see below for the requirements for pre-professional tracks)

BIO 3054 Genetics (WI)  
BIO 3084 Comparative Anatomy and Evolution of Vertebrates  
BIO 3244 Comparative Morphology and Evolution of Plants(WI)  
BIO 3304 Plant Physiology (WI)  
BIO 3314 Animal Physiology (WI)  
BIO 3524 General Ecology (WI)  
BIO 3544 Human Anatomy & Physiology I  
BIO 3554 Human Anatomy & Physiology II  
BIO 4214 Cell Biology (WI)  
BIO 4371-4373 Independent Research  
CHM 2084 Quantitative Analysis  
CHM 3063 Organic Chemistry I  
CHM 3051 Organic Chemistry I Laboratory  
CHM 3073 Organic Chemistry II  
CHM 3131 Organic Chemistry II Laboratory  
CHM 4283 Biochemistry  
CHM 4381 Biochemistry Laboratory  
CHM 4181-4383 Independent Research  
PHY 2362 Statics

PHY 3053 General Astronomy  
PHY 3083 Mechanics  
PHY 3103 Modern Physics  
PHY 3173 Optics  
PHY 3323 Applied Acoustics  
PHY 3434 Digital Electronics  
PHY 3464 Electric Circuits  
PHY 3473 Computational Physics  
PHY 4093 Thermal Physics  
PHY 4183 Electrodynamics  
PHY 4273 Introduction to Quantum Mechanics  
PHY 4211-4213 Independent Research

**Pre-Professional Tracks:**

**Pre-Dental Hygiene**

BIO 3544 Human A & P I  
BIO 3554 Human A&P II  
8 additional 3000/4000 level hours of biology, chemistry, or physics

Also requires:

PSY 1013 Gen Psychology  
SOC 1013 Intro to Sociology

**Pre-Dentistry**

(Requires U. Chem)

CHM 3063/3051 Org. Chem I with lab  
CHM 3073/3131 Org. Chem II with lab  
CHM 4283 Biochemistry  
CHM 4381 Biochemistry Lab  
4 additional 3000/4000 level hours of biology, chemistry, or physics

Recommended:

BIO 3054 Genetics  
BIO 4214 Cell Biology  
BIO 3084 Comparative Anatomy

**Pre-Medical**

Requires University Chemistry I and II  
CHM 3063/3051 Org. Chem I with lab  
CHM 3073/3131 Org. Chem II with Lab  
CHM 4283 Biochemistry  
BIO 3054 Genetics  
1 additional 3000/4000 level hour of biology, chemistry, or physics

Recommended:

CHM 4381 Biochemistry Lab

BIO 3544 Human A & P I  
BIO 3554 Human A&P II  
BIO 4214 Cell Biology

### **Pre-Optometry**

Requires University Chemistry I and II  
CHM 3063/3051 Org. Chem I with lab  
CHM 3073/3131 Org. Chem II with lab  
CHM 4283 Biochemistry  
5 additional 3000/4000 level hours of biology, chemistry, or physics

Also Requires:  
PSY 1013 Gen Psych  
MTH 1294 Calculus I

Recommended:  
CHM 4381 Biochemistry Lab

### **Pre-Physical Therapy**

BIO 3544 Human A & P I  
BIO 3554 Human A&P II  
BIO 3084 Comparative Anatomy  
4 additional 3000/4000 level hours of biology, chemistry, or physics

Also Requires:  
PSY 1013 Gen Psych

### **Pre-Veterinary**

Requires University Chemistry I and II  
CHM 3063/3051 Org. Chem I with lab  
CHM 3073/3131 Org. Chem II with lab  
BIO 3084 Comparative Anatomy  
CHM 4283 Biochemistry  
1 additional 3000/4000 level hour of biology, chemistry, or physics

Also Requires:  
MTH Trigonometry

### **Pre-Pharmacy**

Requires University Chemistry I and II  
CHM 3063/3051 Org. Chem I with lab  
CHM 3073/3131 Org. Chem II with lab  
8 additional 3000/4000 level hours of biology, chemistry, or physics

Highly Recommended:  
MTH 1294 Calculus I  
BIO 3054 Genetics  
BIO 4214 Cell Biology  
CHM 2084 Quantitative Analysis  
BIO 3544 Human A&P I  
BIO 3554 Human A&P II

## **Computer Science**

The Computer Science program offers programs of study leading to a Bachelor of Science degree in computer science, a minor in computer science, and two computing certificates. The program is based upon guidelines as specified in the latest report by The Joint Task Force on Computing Curricula of the IEEE Computer Society and The Association for Computing Machinery. The program regularly reviews and adapts the program to ensure that it continues to satisfy these guidelines, but also meets the needs of the students and the organizations of which they will be part. By staying abreast of changes in the industry, the faculty is able to incorporate new technologies and ideas into the program and to provide students with a solid foundation on which they can build during their careers. Throughout the program, the theoretical concepts of computer science as well as the practical issues of implementation are stressed. Emphasis is placed on the "complete" problem-solving process.

The mission of the computer science program is to provide its majors with the expertise to become leaders and innovators in information technology and to produce graduates that will be successful professionals, be committed to lifelong learning, and make positive contributions to society.

Successful computer science graduates find themselves faced with a variety of career paths. These include application/system programmers, systems analysts, software engineers, database management administrators, and network administrators to name a few. Students receive a solid foundation preparing them for these choices through the computer science core courses. This core consists of courses in programming concepts, data structures, algorithms, software engineering, database management systems, architecture, operating systems, formal languages and programming languages.

A student's knowledge of the computing discipline is also supplemented with additional elective course work. This can include courses in communication and networking, interfacing and machine control, machine intelligence, visual programming, graphics, electronics, compiler theory, and client/server programming among others. Other requirements for the degree include a number of mathematics and science courses as well as the liberal arts core. Additional hours are also required in the areas of written and verbal communication. Collectively, these courses provide a computer science graduate with the necessary foundation to either enter the job market or pursue an advanced degree.

### **Requirements for a Bachelor of Science Degree in Computer Science**

To obtain a Bachelor of Science degree in computer science students must complete at least 120 semester hours of college-level academic work. Students who enter the program adequately prepared can complete degree requirements over the course of eight semesters. Others, however, may require additional time. This is

usually the case for students needing preparatory courses or for those taking course loads lighter than that listed here. Consultation with academic advisors assists students in preparing a plan of study that will enable the student to obtain the degree within the confines of the academic requirements as well as their own personal objectives.

In addition to the courses listed below for a Bachelor of Science degree in Computer Science, all students must complete the Liberal Arts Core requirements as specified by the University. Note that the courses specified below for mathematics and science can be counted as meeting the Liberal Arts Core requirements for courses in their respective areas

### **Computer Science Core Hours**

CSC 1104 Foundations of Computer Science I 4  
CSC 1114 Foundations of Computer Science II 4  
CSC 2173 Assembler Language 3  
CSC 2203 Data Structures 3  
CSC 3223 Algorithm Analysis 3  
CSC 3443 Computer Organization 3  
CSC 3453 Programming Languages 3  
CSC 3193 Operating Systems 3  
CSC 3133 Database Theory 3  
CSC 3463 Software Engineering 3  
CSC 3433 Computational Complexity 3  
CSC 3472 (WI) Technology and Society 2  
CSC 4483 Capstone 3

### **Computer Science Electives Hours**

Jr/Sr Computer Science Courses 9

### **Mathematics Hours**

MTH 2283 Discrete Mathematics I 3  
MTH 1294 Calculus I 4  
MTH 2044 Calculus II 4  
STA 2323 Statistical Methods\* 3

Jr/Sr Mathematics 3

\*May substitute MTH 3163 – Probability and Statistics I

### **Science (choose one sequence) Hours**

CHM 1014/1024 University Chemistry I/II or 8  
PHY 2034/2044 General Physics I/II or 8  
PHY 2234/2244 University Physics I/II 8

### **Other Hours**

ENG 3613 Technical Writing 3

## **Requirements for a Minor in Computer Science**

In addition to the Bachelor of Science in Computer Science degree, the program also offers a minor in computer science. The minor is structured to provide the student with a basic foundation of computer programming and supplies exposure to more advanced computing concepts through elective courses. Students seeking a minor in computer science are encouraged to consult with the academic advisors in the program to customize the program to satisfy their needs.

### **Computer Science Core Hours**

CSC 1104 Foundations of Computer Science I 4  
CSC 1114 Foundations of Computer Science II 4  
CSC 2203 Data Structures 3

### **Computer Science Electives Hours**

Jr/Sr Computer Science 6

### **Mathematics Hours**

MTH 2283 Discrete Mathematics 3

## **Requirements for a Certificate in Computer Science**

Students may also earn certificates in Information Technology Essentials and/or Software Development. These certificates require 12 and 14 hours of computer science, respectively.

### **IT Essentials Certificate Hours**

CSC 2003 Introduction to Computers 3  
CSC 2013 Windows Security Fundamentals 3  
CSC 2163 Microcomputer Applications (Excel) 3  
CSC 2163 Microcomputer Applications (Access) 3

### **Software Development Certificate Hours**

CSC 1104 Foundations of Computer Science I 4  
CSC 1114 Foundations of Computer Science II 4  
CSC 2203 Data Structures 3  
CSC 3133 Introduction to Database Theory 3

**Statistics Minor Requirements - 18 Hours** (*minimum*)

The minor in statistics requires STA 2323 (Statistical Methods), STA 2053 (Applied Biostatistics), or a substitute approved by the program and 15 more hours from the list of Statistics Electives. Students in the pure mathematics track can minor in statistics, but no elective can apply to both the major and the minor. At least nine hours of the electives must have a STA, MTH, or CSC prefix and be at the junior-senior level. **Mathematics Minor Requirements- 17 Hours** (*minimum*)

The minor in mathematics requires **17** hours of MTH or STA courses at or above Calculus I (MTH 1294). At least one three-credit MTH or STA course at the junior or senior level is required. Mathematics courses specifically designed for elementary or middle-level education will not be counted towards a minor in mathematics. At most three total credit hours of MTH, CSC, or STA internship can be used as electives.

### **Requirements for a Minor in Biology**

#### **Required Courses:**

BIO 2104 General Botany  
BIO 2114 General Zoology

In addition to the two courses above, students choose any three of the following courses to complete a minor in biology:

BIO 2094 Microbiology  
BIO 3054 Genetics  
BIO 3084 Comparative Anatomy and Evolution of Vertebrates  
BIO 3244 Comparative Morphology and Evolution of Plants  
BIO 3524 General Ecology  
BIO 3544, 3554 Human Anatomy and Physiology I and II  
(Together count as one class)  
BIO 4214 Cell Biology

Total hours required for a minor in Biology: 20

### **Chemistry Minor**

The requirements to receive a minor in chemistry are 19 hours of chemistry. The 19 hours must include CHM 1014, CHM 1024, CHM 3063, and CHM 3051. The final seven hours can come from: CHM 2084 and/or any 3000/4000 level chemistry courses except for Nutritional Biochemistry (CHM 3313). No more than 12 hours in chemistry may be counted for both the minor in chemistry requirements and the major requirements for a different discipline. Chemistry courses may be substituted to meet the minor requirements.

### **ENGINEERING and PHYSICS (updated June 20, 2023)**

The Engineering and Physics program offers programs of study leading to a Bachelor of Science degree in Engineering, Bachelor of Science degree in Computer Engineering, Bachelor of Arts degree in Physics, Bachelor of Science degree in Physics and a Bachelor of Science degree in Physics with Teacher Licensure.



## Engineering Degrees

The engineering program is built upon a strong foundation in mathematics, science, and engineering fundamentals. Graduates of the program are qualified and prepared to meet the demands of a professional career in the present and future workplace and to assume a responsible place of leadership in a complex technological society.

### Program Educational Objectives

The engineering program has a mechanism in place to periodically assess its effectiveness in meeting its educational objectives and outcomes (see below). This assessment process results in periodic modification to specific courses and the overall degree plan so as to better promote the achievement of the objectives and outcomes. Additionally, the objectives and outcomes are periodically formulated and revised, with the assistance of the Engineering Advisory Council, in relation to the evolving mission and resource base of the program. This occurs within the context of the evolving needs of the region and nation, and the current state-of-the profession.

The Engineering program strives to produce outstanding graduates who are successful in their careers. Within the three to five years following graduation a Henderson State University engineering alumni will:

- Have an engineering job or a position that utilizes the application of their engineering education in the workplace.
- Have completed professional development activities to enhance their credentials, including the pursuit of advanced degrees appropriate to their career fields.

The engineering program's outcomes define the knowledge, skills, attitudes, and behaviors that program graduates are expected to have by the time of graduation from the program. Graduates of the engineering program will have:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

### Major Requirement for the Bachelor of Science Degree in Engineering (General Track)

EGR 1413 Engineering Graphics .....	3
EGR 2033 Introduction to Materials .....	3
EGR 2253 Engineering Computation .....	3
EGR 2363 Statics .....	3
EGR 2584 Electric Circuits I .....	4
EGR 3043 Engineering Thermodynamics I .....	3
EGR 3434 Digital Electronics .....	4
EGR 3474 Electronics I .....	4
EGR 3493 Dynamics.....	3
EGR 3543 Engineering Measurements .....	3
EGR 4443 Embedded Systems .....	3
EGR 4513 Fluid Mechanics .....	3

EGR 4523 Engineering Electromagnetics .....	3
EGR 4263 Engineering Design I .....	3
EGR 4553 Engineering Design II .....	3

**Choose one of the following**

EGR 3114 Strength of Materials .....	4
EGR 3464 Electric Circuits II .....	4
EGR 3484 Electronics II .....	4

**Choose one of the following**

EGR 3053 Engineering Thermodynamics II .....	3
EGR 3143 Signals and Systems .....	3
EGR 3503 Engineering Optics .....	3
EGR 4123 Heat Transfer .....	3
EGR 4133 Power Systems .....	3
EGR 4563 Control Systems .....	3

**Major Requirement for the Bachelor of Science Degree in Engineering (Electrical Track)**

EGR 1413 Engineering Graphics .....	3
EGR 2033 Introduction to Materials .....	3
EGR 2253 Engineering Computation .....	3
EGR 2363 Statics .....	3
EGR 2584 Electric Circuits I .....	4
EGR 3043 Engineering Thermodynamics I .....	3
EGR 3434 Digital Electronics .....	4
EGR 3474 Electronics I .....	4
EGR 3493 Dynamics .....	3
EGR 3543 Engineering Measurements .....	3
EGR 4513 Fluid Mechanics .....	3
EGR 4263 Engineering Design I .....	3
EGR 4553 Engineering Design II .....	3
EGR 4563 Control Systems .....	3
EGR 4153 Professional Engineering Practices .....	3

Choose any 2-electives

EGR 3143 Signals and Systems .....	3
EGR 3464 Electric Circuits II .....	4
EGR 4443 Embedded Systems .....	3
EGR 4523 Electromagnetics .....	3

**Major Requirement for the Bachelor of Science Degree in Engineering (Mechanical Track)**

EGR 1413 Engineering Graphics .....	3
EGR 2033 Introduction to Materials .....	3
EGR 2253 Engineering Computation .....	3
EGR 2363 Statics .....	3
EGR 2584 Electric Circuits I .....	4

EGR 3043 Engineering Thermodynamics I .....	3
EGR 3114 Strength of Materials .....	4
EGR 3474 Electronics I .....	4
EGR 3493 Dynamics .....	3
EGR 3543 Engineering Measurements .....	3
EGR 4123 Heat Transfer .....	3
EGR 4513 Fluid Mechanics .....	3
EGR 4263 Engineering Design I .....	3
EGR 4553 Engineering Design II .....	3
EGR 4153 Professional Engineering Practices .....	3

Choose any 2-electives

EGR 3053 Engineering Thermodynamics II .....	3
EGR 4433 Embedded Systems .....	3
EGR 4563 Control Systems .....	3

### **Additional Requirements for the Engineering General, Electrical or Mechanical Track**

CHM 1014 University Chemistry I .....	4
MTH 1294 Calculus I .....	4
MTH 2044 Calculus II .....	4
MTH 3104 Calculus III .....	4
MTH 3124 Differential Equations .....	4
PHY 2234 University Physics I .....	4
PHY 2244 University Physics II .....	4

The Bachelor of Science degree in Engineering requires a mathematics or physics minor.

### **Major Requirement for the Bachelor of Science Degree in Computer Engineering**

#### **Engineering Courses (36 Hours)**

EGR 12033 Introduction to Engineering .....	3
EGR 2253 Engineering Computation .....	3
EGR 2584 Electric Circuits I .....	4
EGR 3434 Digital Electronics .....	4
EGR 3474 Electronics I .....	4
EGR 4063 Computer Engineering Design I .....	3
EGR 4073 Computer Engineering Design II .....	3
EGR 4443 Embedded Microprocessors .....	3
EGR 4543 Engineering Measurements .....	3
EGR 4563 Control Systems .....	3
EGR JR/SR Elective .....	3

#### **Computer Science Courses (23 Hours)**

CSC 1104 Foundations of Computer Science I .....	3
CSC 1114 Foundations of Computer Science II .....	3
CSC 2173 Assembler .....	3
CSC 2203 Data Structures .....	3
CSC 3193 Operating Systems .....	3
CSC 3223 Algorithm Analysis .....	3

CSC 3443 Computer Organization .....	3
--------------------------------------	---

**Additional Requirements for the Computer Engineering Degree**

MTH 1294 Calculus I .....	4
MTH 2044 Calculus II .....	4
MTH 2283 Discrete Mathematics .....	4
MTH 3124 Differential Equations .....	4
STA 2323 Stat Methods or STA 2053 Applied Biostat .....	3
PHY 2234 University Physics I .....	4
PHY 2244 University Physics II .....	4

Bachelor of Science degree in Computer Engineering will have earned enough hours to obtain a minor in mathematics and will not be required to complete an additional minor.

**Engineering Minor Requirements**

In addition to the Bachelor of Science degree, the program also offers a minor in engineering. The curriculum provides the student with a foundation of engineering. Physics majors can minor in engineering, but no elective can apply to both the major and the minor. In addition to the courses listed below, the awarding of a minor in engineering will require that the student has made a grade of C or better in all courses comprising the 24 credit hours.

PHY 2234 University Physics I .....	4
PHY 2244 University Physics II .....	4
EGR 1413 Engineering Graphics .....	3
EGR 2033 Introduction to Materials .....	3
EGR 2363 Statics .....	3
EGR 3043 Engineering Thermodynamics I .....	3

**Choose one of the following**

EGR 2584 Electric Circuits I .....	4
EGR 3474 Electronics I .....	4
EGR 3434 Digital Electronics .....	4

**Bachelor of Science Degree in Physics**

The physics program combines formal class work with hands-on laboratory work and independent research to create not just future scientists, but future leaders in the community. Following graduation, students find these skills in demand for careers such as science teaching, technical management, software or hardware engineering. Other physics graduates gain admission to graduate programs and continue their studies in specialized fields such as medical physics, meteorology, astrophysics, engineering, or geophysics. Many of our physics majors have gone on to receive a Ph.D. degree in physics. We are lucky to count teachers, engineers, business people, and others among our former students.

**Program Educational Objectives**

The Physics program strives to produce outstanding graduates who are successful in their careers. Within the three to five years following graduation a Henderson State University engineering alumni will:

- Have a job or a career that utilizes the knowledge and skills gained through their physics education in the workplace.
- Have completed professional development activities or graduate study to enhance their credentials appropriate to their career fields. As we prepare

our graduating students to compete successfully for desired professional positions or to be accepted into highly selective graduate programs, students gain the following skills:

- a. the ability to apply knowledge of mathematics, science, and engineering
- b. the ability to communicate effectively with a range of audiences
- c. the ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- d. the ability to develop and conduct appropriate experimentation, analyze and interpret data, and use judgment to draw conclusions.

**Major Requirement for the Bachelor of Science Degree (Traditional Physics)**

PHY 2234 University Physics I .....	4
PHY 2244 University Physics II .....	4
PHY 3083 Mechanics .....	3
PHY 3103 Modern Physics .....	3
PHY 3473 Computational Physics .....	3
PHY 4183 Electrodynamics .....	3
PHY 4253 Advanced Physics Lab .....	3
PHY 4273 Quantum Mechanics.....	3
Junior-Senior Physics or Engineering Electives .....	12

**Major Requirement for the Bachelor of Science Degree (Astronomy Track)**

PHY 2234 University Physics I .....	4
PHY 2244 University Physics II .....	4
PHY 3053 General Astronomy .....	3
PHY 3083 Mechanics .....	3
PHY 3103 Modern Physics .....	3
PHY 3173 Optics .....	3
PHY 3473 Computational Physics .....	3
PHY 4093 Thermodynamics .....	3
PHY 4183 Electrodynamics .....	3
PHY 4253 Advanced Physics Lab .....	3
PHY 4273 Quantum Mechanics .....	3
PHY 4293 Nonwestern Cosmology .....	3
PHY 4343 Astrophysics and Cosmology .....	3

**Additional Requirements for the Traditional or Astronomy Track**

MTH 1294 Calculus I .....	4
MTH 2044 Calculus II .....	4

**Major Requirement for the Bachelor of Science Degree (Teacher Licensure in Physics)**

PHY 2234 University Physics I .....	4
PHY 2244 University Physics II .....	4
PHY 3083 Mechanics .....	3
PHY 3103 Modern Physics .....	3
PHS 3154 Physical Science for Teachers .....	4
PHY 3464 Electric Circuits .....	4

PHY 4253 Advanced Physics Lab .....	3
PHY 4293 Non-Western Cosmology .....	3
PHS 4953 Special Methods: Physical Science .....	3
Junior-Senior Physics or Engineering Electives .....	6

**Education Requirements for Bachelor of Science Degree (Teacher Licensure in Physics)**

EDU 2000 Teacher Education Orientation.....	0
EDU 2423 Introduction to Education.....	3
EDU 2043 Education Technology.....	3
SPE 3013 Psychology of the Exceptional Child.....	3
EDU 3123 Educational Psychology.....	3
EDU 4402 Assessment.....	2
EDU 4113 Classroom Management 7-12.....	3
EDE 4216 Internship Content .....	6
EDE 4256 Internship Clinical.....	6

**Bachelor of Arts Degree in Physics**

The Bachelor of Arts degree in Physics is for students desiring a broader program in the arts, sciences, and social sciences while majoring in physics. This program is recommended for journalism, pre-business, pre-law and other students planning careers in fields for which a physics education would be beneficial.

**Major Requirement for the Bachelor of Arts Degree**

MTH 1294 Calculus I .....	4
PHY 2234 University Physics I .....	3
PHY 2244 University Physics II .....	3
PHY 3103 Modern Physics .....	3
PHY 4253 Advanced Physics Lab .....	3

**Required Electives**

PHY 3053 General Astronomy .....	3
PHY 3173 Optics .....	3
PHY 3323 Acoustics .....	3
PHY 3473 Computational Physics .....	3
PHY 4293 Nonwestern Cosmology .....	3

**Additional Requirements for the Bachelor of Arts Degree in Physics**

Six hours of elementary Foreign Language courses in French, German, or Spanish.

**Physics Minor Requirements**

In addition to the Bachelor of Science degree, the program also offers a minor in physics. The minor in physics requires 14

hours and is composed of the following courses:

- General Physics I (PHY 2034) or University Physics I (PHY 2234)
- General Physics II (PHY 2044) or University Physics II (PHY 2244)
- 6-hours of PHY courses at the junior or senior level

## **Programs for Pre-Dentistry, Pre-Medicine, Pre-Optometry, Pre-Physical Therapy, Pre-Veterinary, Pre-Pharmacy, (Updated June 2023)**

Below is the pre-admission course work required for acceptance into the various professional schools. Students interested in one of these areas must confer with an advisor for their area of interest. Admission to professional schools almost always requires a four year degree, therefore your advisor should be a faculty member in the area in which you will major. Students should study carefully the admission requirements posted on their preferred profession school's website, as requirements change occasionally.

### **Pre-Dental Hygiene**

Most HSU pre-dental hygiene students apply to and enter the University of Arkansas for Medical Sciences. The course requirements for application to this school are given below. Other dental hygiene associate programs could have additional or different requirements.

- 14 hrs Biology- Introduction to Biology (with lab) or Zoology, and Microbiology with labs, and Human Anatomy and Physiology I and II (non-majors acceptable)
- 4 hrs Chemistry - General Chemistry
- 3 hrs Math - College Algebra
- 6 hrs English - English A and English B
- 3 hrs History - U.S. History to 1877 or U.S. History since 1877 or American National Government
- 3 hrs Speech - Oral Communication
- 3 hrs Psychology - Gen. Psychology
- 3 hrs Sociology - Introduction to Sociology
- 3 hrs Humanities - World Literature I or II, or Intro to Philosophy
- 6 hrs Electives - must be 3000-4000 level
- 3 hrs Fine Arts - Humanities music, theatre, etc.

### **Pre-Dentistry**

Most HSU pre-dental students apply to and attend the University of Tennessee's College of Dentistry. The course requirements for application to this school are given below. Other dental schools could have additional or different requirements

- 8 hrs Biology - General Zoology and General Botany with labs
- 19 hrs Chemistry - Univ. Chemistry I & II, Organic Chemistry I & II with labs, and Biochemistry I
- 6 hrs English - English A and English B
- 8 hrs Physics - Gen. Physics I & II or Univ. Physics I & II with labs
- 3 to 4 hrs Other biology: Microbiology, or Comparative Anatomy with labs

Recommended electives include Genetics, Comparative Anatomy, Cell Biology, Microbiology

### **Pre-Medical**

Most HSU pre-medical students apply to and attend the University of Arkansas for Medical Sciences College of Medicine. The course requirements for application to this school are given below. Other medical schools could have additional or different requirements.

- Two semesters of Biology
- Three semesters of Chemistry (to include Organic Chemistry with lab, and Biochemistry)
- One semester of Genetics
- Two semesters of Physics

- Two semesters of English
- One semester of Statistics
- Two semesters of Social Sciences (General Psychology and Introduction to Sociology are strongly recommended)

Strongly recommended courses are in the area of Biology: General Zoology, Human Anatomy and Physiology, Cell Biology. It is imperative that students interested in this field consult regularly with their program pre-medical advisor.

### **Pre-Optometry**

Most HSU pre-optometry students apply to and attend the Southern College of Optometry. The course requirements for application to this school are given below. Other optometry schools could have additional or different requirements.

- 12 hrs Biology - General Zoology, General Botany and Microbiology with labs
- 19 hrs Chemistry - Univ. Chemistry I & II, Organic Chemistry I & II, and Biochemistry
- 6 hrs English - English A and English B
- 8 hrs Physics - Gen. Physics I & II or Univ. Physics I & II with labs
- 8 hrs Math - Calculus I and Statistics
- 3 hrs Psychology - General Psychology
- 6 hrs Social Science - Sociology, Psychology, History, Political Science, etc.

### **Pre-Physical Therapy**

Most HSU pre-physical therapy students apply to and enter the physical therapy program at the University of Central Arkansas. The course requirements for application to this school are given below. Other physical therapy programs could have additional or different requirements.

- 16 hrs Biology - General Zoology, Human Anatomy and Physiology I & II, and one 2000 or higher level animal based course
- 8 hrs Chemistry - Univ. Chemistry I & II or Gen. Chemistry and Gen. Organic & Biochemistry with labs
- 8 hrs Physics - Gen. Physics I & II with labs
- 3 hrs Psychology - Gen. Psychology
- 3 hrs Statistics - Statistics or Statistical Methods

### **Pre-Veterinary**

Most HSU pre-veterinary students apply to and attend the Louisiana State University's School of Veterinary Medicine. The course requirements for application to this school are given below. Other veterinary schools could have additional or different requirements.

- 12 hrs Biology - General Zoology, Microbiology and an upper level biology
- 19 hrs Chemistry - Univ. Chemistry I & II, Organic Chemistry I & II, and Biochemistry
- 6 hrs English - English A and English B
- 8 hrs Physics Gen. Physics I & II or Univ. Physics I & II
- 6 hrs Math College Algebra or Pre-Calculus, and Trigonometry

### **Pre-Pharmacy**

Below are the courses required for acceptance into the College of Pharmacy at the University of Arkansas for Medical Sciences. Other pharmacy schools could have additional or different requirements. UAMS requires a total of 61 hours. Humanities electives (humanities, literature, social sciences, history) are taken to complete the required 61 hours. Consult with a pre-pharmacy advisor for options and curriculum requirements for other pharmacy schools. The Biology and Chemistry department and the UAMS College of Pharmacy recommend that students earn their four-year degree before



entering pharmacy school. Acceptance into a professional school is not guaranteed therefore it is wise to work toward a four-year degree as you take these courses.

### **Core Courses**

3 hrs Math - MTH 1243 College Algebra

16 hrs Chemistry - CHM 1014/CHM 1024 University Chemistry I & II and labs, CHM 3063/CHM 3051 Organic Chemistry I and lab, and CHM 3073/CHM 3131 Organic Chemistry II and lab

12 hrs Biology - BIO 2114 General Zoology and lab, BIO 2014 General Botany and lab, BIO 2094 Microbiology and lab

### **Non-core Courses**

6 hrs English - ENG 1463/ENG 1473 Freshman English A & B

3 hrs Business - ECO 2013 Microeconomics **Or** ECO 2023 Macroeconomics **Or** ACC 2013 Principles of Accounting

3 hrs Statistics - STA1313 Statistical Reasoning or STA2323 Statistical Methods

3 hrs Oral Com - COM 2013 Oral Communications

3 hrs Psychology - PSY 1013 General Psychology

3 hrs Humanities Choose from world cultures or history, anthropology, sociology, or foreign language

9 hrs recommend Electives:

CHM 2084 Quantitative Analysis

MTH 1294 Calculus I

PHY 2034 General Physics I and lab

BIO 3054 Genetics and lab

BIO 4214 Cell Biology and lab

CHM 4283 Biochemistry I

BIO 2174 or 3544 Anatomy and Physiology (non-major or major)

Additional Biology and Chemistry electives are recommended for all pre-professional students. The number and names of these biology and chemistry courses depend upon the student's major. It would be best for a student to seek advice from the program in which they intend to major.